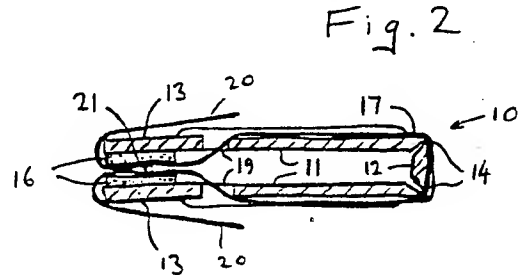
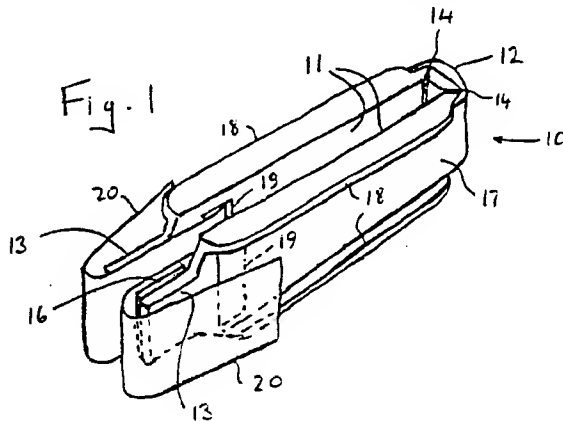
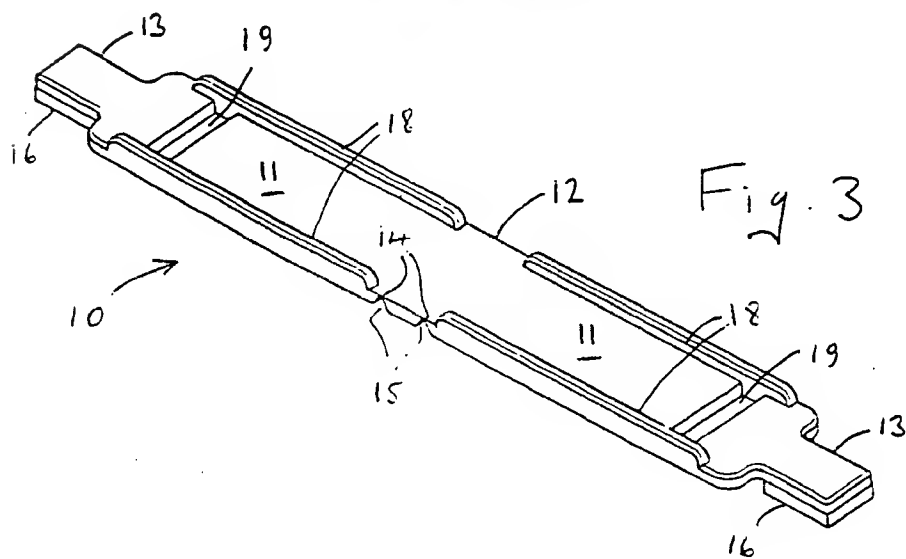
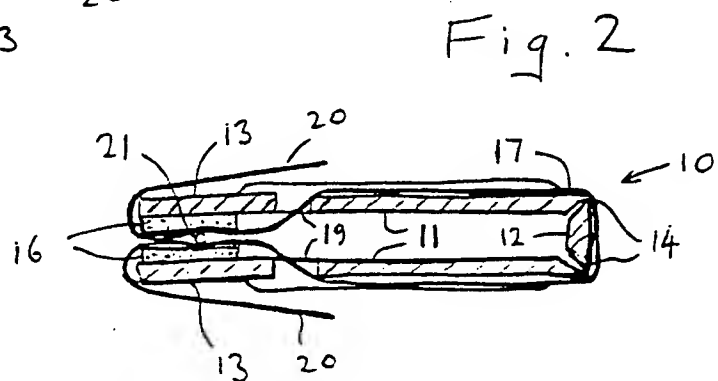
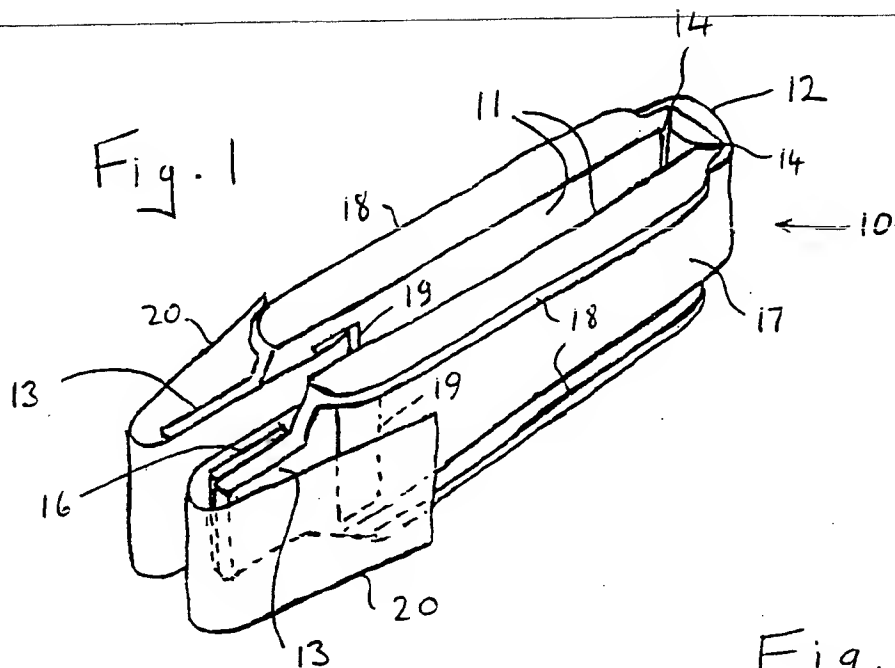


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| (71) Applicant(s)<br>Xerox Corporation<br><br>(Incorporated in USA - New York)<br><br>Xerox Square, Rochester, New York 14644,<br>United States of America | (56) Documents Cited<br>GB 2225931 A GB 2087716 A GB 1213733 A<br>GB 1140924 A GB 0626404 A JP 580161284 A<br>US 4504994 A US 4126962 A |
| (72) Inventor(s)<br>David Michael Newbury<br>Alan Charles Richard Howard<br>John David Canning   | (58) Field of Search<br>UK CL (Edition M ) A4F<br>INT CL <sup>5</sup> A47L 25/00, B08B 1/00 11/00<br>ONLINE DATABASES : WPI             |
| (74) Agent and/or Address for Service<br>Rank Xerox Limited<br>Parkway, MARLOW, Bucks, SL7 1YL, United Kingdom   |   |

(54) Corotron wire cleaning tool

(57) Corotron wire cleaning tool (10) comprising a pair of arms (11) joined at one end and spring urged apart at their other, open, ends (13) in tweezers configuration. The open ends (13), on their surfaces facing one another, each have each a resilient pad (16), and support a replaceable strip (17) of cleaning material, such as paper. The strip (17) of cleaning material passes over the outside surface of the tool and around the hinged end (12), and the free ends (20) of the strip are inserted through slots (19) adjacent the open ends (13) of the arms (11). The free ends (20) are folded over the facing surfaces of the open ends (13) of the arms (11).





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COROTRON WIRE CLEANING TOOL

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This invention relates to a corotron wire cleaning tool which is particularly useful for cleaning corotron wires of electrostatographic copying or printing machines.

In electrostatographic machines, corotrons are used to apply electrostatic charge at high potential to an imaging surface. The corotrons typically consist of one or more metal wires stretched between insulating supports. In use, such corotron wires can become contaminated by a variety of materials from their surroundings, including dust and other small particles and fibres. Rather than replacing contaminated corotrons or their wires, it has been found to be more cost-effective to clean the wires. For ease and convenience in cleaning corotron wires, a tweezers-like tool has been used in which pads of felted material are fixed to the inside surfaces of the opening ends of the tweezers. The tweezers are of a plastics material with their arms spring-urged apart. By squeezing the tweezers so that the felt pads close together over the wire, a cleaning action may be carried out by pulling the closed tweezers along the wire.

Although the presently used tweezers are effective in cleaning corotron wires, they suffer from the disadvantages that if they are used to clean several corotron wires in succession, there is a possibility of cross-contamination, i.e. contamination from one corotron wire may be carried by the cleaning tool to subsequently cleaned wires. Furthermore, fibres from the felted material of the cleaning pads may be deposited on the corotron wire, causing localised distortions of the electric field surrounding the wire, with corresponding deletions or blemishes in the final images produced by the electrostatographic machine.

It is an object of the present invention to provide a corotron wire cleaning tool which overcomes these disadvantages.

According to the present invention, there is provided a corotron wire cleaning tool comprising a pair of arms joined together at one end and spring-urged apart at the other end in tweezers configuration, said other ends each being adapted to carry a replaceable strip of cleaning material.

Preferably, a single strip of material is used to provide the cleaning surfaces of both arms.

The preferred cleaning material is paper.

By using a replaceable strip of cleaning material, each corotron wire may be cleaned by a piece of material which is used only once, and is then discarded, thereby eliminating the possibility of cross-contamination. By the appropriate choice of cleaning material, such as paper, the chances of unwanted fibres being deposited on the corotron wires are reduced considerably.

A corotron cleaning tool in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of the tool ready for use;

Figure 2 is a cross-sectional side view of the tool in use; and

Figure 3 is an isometric view of the body of the tool as manufactured, i.e. opened out flat, without a strip of cleaning material in place.

Referring to the drawings, the corotron wire cleaning tool consists of a tweezers-like arrangement 10 which has two arms 11 hinged together at one end about an end portion 12. The other ends 13 of the arms 11 are resiliently urged apart from one another. While any suitable material may be used to make the tool, such as a metal or a plastics material, a preferred material is polypropylene, with the body of the tool being manufactured in a single piece as shown in Figure 3.

The two arms 11 are hinged about the end portion 12 by means of "living hinges", which consist of thinned, flexible, portions 14 of the body of the tool, extending transversely across the tool. Each thinned portion 14, when viewed in cross section, is at the apex of a triangular groove extending across the body of the tool, with the included angle at the apex being less than 90°, for example about 80°. Thus, on folding the arms 11 towards one another with the thinned portions 14 on the outside of the folds, the walls 15 of the grooves contact each other before the ends 13 of the arms 11 come into contact. The ends 13 can thus only be made to contact each other by overcoming the resilience of the arms 11, to produce the tweezers-like arrangement.

Each end 13 of the arms 11 carries on its inner face (as viewed in Figures 1 and 2) a pad 16 of resilient material, secured for example by an adhesive. The ends 13 of arms 11 are narrower than the main parts of the arms 11, and the pads 16 extend from edge to edge across the ends 13. The pads 16 may be of a foamed plastics material, preferably a closed-cell foamed plastic such as Poron.

The pads 16 provide resilient backing for a strip 17 of cleaning material which is used as the cleaning medium for contacting corotron wires. The strip 17 of cleaning material is simply wrapped around the ends 13, and may be used once and then discarded. In order to assist in keeping the strip 17 in place the tool has upstanding edge ribs 18 along the outside surfaces of arms 11, and slots 19 extending across the arms 11 near their ends 13. The slots 19 extend completely across the arms 11 from the inside face of one edge rib 18 to the inside face of the opposite edge rib 18. A strip 17 of cleaning material of substantially the same width as the slots 19 is placed around the outside of the tool, between the edge ribs 18, and with its two ends inserted through the slots 19. The free ends 20 of the strip are passed over the pads 16 and simply folded back around the ends 13 as shown. This arrangement retains the cleaning material strip on the tool adequately for a single-use cleaning operation.

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The strip 17 may be of any suitable natural or synthetic material which can be supplied in strip form, with the preferred material being paper. The strip may be provided, for example, in a roll, with periodic transverse lines of perforations to define suitable lengths for tearing off for use on the tool. The cleaning material strip 17 is slightly wider than the ends 13 and the pads 16, so that the edges of the strip extend beyond the edges of the pads 16. These unsupported edges of the strip perform a useful cleaning action on wires being cleaned.

In use of the tool, with the cleaning strip in place, the ends 13 are brought into position on either side of a corotron wire 21 to be cleaned, and then squeezed together. The tool is then moved along the wire to produce a wiping action. It can then be rotated to a new position around the wire and the wiping action repeated, to ensure that the whole circumference of the wire is cleaned. Preferably, a two-stage cleaning is performed, with the first step using paper which has been made wet by a suitable solvent, and with the second step performed using dry paper. After each of these steps, the paper strip is discarded and replaced by a new one. The use of closed-cell foam pads 16 prevents the pads from absorbing the solvent.

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CLAIMS:

- 1 Corotron wire cleaning tool comprising a pair of arms joined at one end and spring urged apart at their other ends in tweezers configuration, said other ends, on their surfaces facing one another, each supporting a replaceable strip of cleaning material.
2. The tool of claim 1 wherein the cleaning material is a single strip.
3. The tool of claim 2 wherein each arm has a slot adjacent said other end, with the strip of cleaning material passing over the outside surface of the tool and around the hinged end, and with the free ends of the strip inserted through the slots and over the facing surfaces of said other ends.
- 4 The tool of claim 2 or claim 3 including edge ribs along the outside edges of the arms, for guiding the strip over the outside surfaces of the tool.
- 5 The tool of any one of claims 1 to 4 wherein said other ends of the arms are narrower than the strip of cleaning material.
6. The tool of any one of claims 1 to 5 including resilient pads on the facing surfaces of said other ends of the arms, for resiliently supporting the strip of cleaning material.
- 7 The tool of claim 6 wherein the resilient pads are substantially non-absorbent of liquids.
8. The tool of any one of claims 1 to 7 wherein the cleaning material is paper.

Relevant Technical Fields

Search Examiner  
A C HOWARD

(i) UK Cl (Ed.M) A4F

(ii) Int Cl (Ed.5) B08B 1/00, 11/00; A47L 25/00

Date of completion of Search  
17 FEBRUARY 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
1-8

(ii) ONLINE DATABASE: WPI

Categories of documents

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
- Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

| Category | Identity of document and relevant passages |   | Relevant to claim(s) |
|----------|--|---|----------------------|
| Y        | GB 2225931 A                               | (SCOTT YOUNG) see page 4 paragraph 1                                    | 1,2                  |
| Y        | GB 2087716 A                               | (STEWART) see eg Figure 7 and page 3 lines 68-71                        | 1                    |
| X,Y      | GB 1213733                                 | (BOSCH-WISSELINK) see page 1 line 83 - page 2 line 6 and page 2 line 22 | Y:1,2<br>X:6-8       |
| Y        | GB 1140924                                 | (SHIMONO) whole document relevant                                       | 1                    |
| Y        | GB 0626404                                 | (DENTON) whole document relevant  | 1                    |
| Y        | US 4504994                                 | (JOHNSTON) see column 3 lines 6-15                                      | 1                    |
| Y        | US 4126962                                 | (POLCARO) whole document relevant                                       | 1                    |
| Y        | JP 580161284                               | (FUJI XEROX KK) see Figures 3, 4  | 1                    |

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).